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| FORM PTO 1390 (REV. 11-2000) | U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371 | ATTORNEY DOCKET NUMBER 825-160 |
| | | U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 10/031919 |

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| INTERNATIONAL APPLICATION NO. PCT/CH00/00399 | INTERNATIONAL FILING DATE 07/20/2000 | PRIORITY DATE CLAIMED 07/22/1999 |
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| TITLE OF INVENTION PLASTIC SCREW CAP |
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| APPLICANT(S) FOR DO/EO/US WILHELM WAZEL and ROBERT ARMIN GILGEN |
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Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

- ☐ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
- ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
- ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - ☐ is attached hereto (required only if not communicated by the International Bureau).
 - ☐ has been communicated by the International Bureau.
 - ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☒ A English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - ☒ is attached hereto.
 - ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
- ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - ☐ are attached hereto (required only if not communicated by the International Bureau).
 - ☐ have been communicated by the International Bureau.
 - ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - ☐ have not been made and will not be made.
- ☐ A English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
- ☐ A English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern other document(s) or information included:

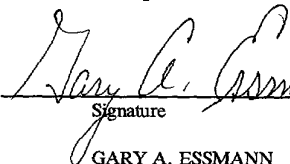
- ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
- ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
- ☒ A **FIRST** preliminary amendment.
- ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
- ☐ A substitute specification.
- ☐ A change of power of attorney and/or address letter.
- ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
- ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
- ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
- ☒ Other items or information:
 - ☐ Applicant claims small entity status.
 - ☒ Supplement to Transmittal Letter.

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| U.S. APPLICATION NO. (if known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">10/031919</div> | | INTERNATIONAL APPLICATION NO. PCT/CH00/00399 | | ATTORNEY'S DOCKET NUMBER 825-160 | |
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|---|--------------|--------------|------------|----------------------------------|--|
| 21. <input type="checkbox"/> The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$ 1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO..... \$ 890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4).. \$ 710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims satisfied provisions of PCT Article 33(1)-(4)..... \$ 100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT = \$890.00</div> | | | | CALCULATIONS PTO USE ONLY | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 C.F.R. 1.491(3)). | | | | +130.00 | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
| Total Claims | 10 - 20 = | | x \$ 18.00 | | |
| Independent Claims | 1 - 3 = | | x \$ 84.00 | | |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | | + \$280.00 | | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$1020.00 | |
| <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. | | | | - | |
| SUBTOTAL = | | | | \$1020.00 | |
| Processing fee of \$130.00 for furnishing the English Translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)). | | | | + | |
| TOTAL NATIONAL FEE = | | | | \$1020.00 | |
| Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property | | | | + | |
| TOTAL FEES ENCLOSED = | | | | \$1020.00 | |
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| a. <input checked="" type="checkbox"/> | A check in the amount of \$ <u>1020.00</u> to cover the above fees is enclosed. |
| b. <input type="checkbox"/> | Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. |
| c. <input checked="" type="checkbox"/> | The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>01.2000</u> . A duplicate copy of this sheet is enclosed. |
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NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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| SEND ALL CORRESPONDENCE TO: ANDRUS, SCEALES, STARKE & SAWALL, LLP 100 East Wisconsin Avenue, Suite 1100 Milwaukee, Wisconsin 53202 Phone: (414) 271-7590 Fax: (414) 271-5770 | <div style="font-size: 1.5em; font-family: cursive;">  </div> <div style="display: flex; justify-content: space-between;"> Signature Date </div> <div style="display: flex; justify-content: space-between;"> GARY A. ESSMANN 29.376 </div> <div style="display: flex; justify-content: space-between;"> Name Reg. No. </div> |
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| U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 10/031919 | INTERNATIONAL APPLICATION NO. PCT/CH00/00399 | ATTORNEY'S DOCKET NUMBER 825-160 |
| CERTIFICATE OF EXPRESS MAIL | | |
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| GARY A. ESSMANN | 29,376 | |
| Name | Reg. No. | |
| <i>Gary A. Essmann</i> | <i>1-21-02</i> | |
| Signature | Date | |

2001 JAN 22 10 51 AM '02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:)
)
WILHELM WAZEL and) PLASTIC SCREW CAP
ROBERT ARMIN GILGEN)

PRELIMINARY AMENDMENT

Milwaukee, Wisconsin 53202

Box Patent Application
Asst. Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to computing the filing fee in this application, kindly amend the above identified application, as follows. The filing fee is to be computed on the amended claims.

In the Abstract:

A clean copy of the Abstract as published is attached. No changes to the Abstract have been made.

In the Specification:

Beginning at page 1, between the title and the first line of text, the specification has been amended as follows:

CROSS REFERENCE TO RELATED APPLICATION

The present application is the U.S. national stage application of International Application PCT/CH00/00399, filed July 20, 2000, which international application was published on February 1, 2001 as International Publication WO 01/07334 A1. The International Application claims priority of Swiss Patent Application 1338/99, filed July 22, 1999 and Swiss Patent Application 2363/99 filed December 23, 1999.

SUMMARY OF THE INVENTION

Paragraph beginning at line 5 on page 1 has been amended as follows:

The present invention relates to a screw cap made of a plastic material for screwing onto a thread on a neck of a bottle.

Before the paragraph beginning at line 19 of page 2, insert the following:

BRIEF DESCRIPTION OF THE INVENTION

Paragraph beginning at line 23 on page 2 has been amended as follows:

This object is solved by means of a screw cap having the features as described in the claims. Further advantageous configurations of the invention are defined in the depending claims.

Before the paragraph beginning at line 15 of page 3 insert the following:

BRIEF DESCRIPTION OF THE DRAWINGS

Before the paragraph beginning at line 7 of page 4 insert the following:

BRIEF DESCRIPTION OF THE INVENTION

In the Amended Claims:

Claim 3 has been amended as follows:

3. A screw cap according to claim 1, characterized in that the sealing lip (19) protrudes beyond a peak of the spacer (31) at a height (h2) axially downwards to a height (h1).

Claim 6 has been amended as follows:

6. A screw cap according to claim 1, characterized in that radially inside of the first spacer (31), a second spacer (35) is formed on the cap bottom.

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Claim 7 has been amended as follows:

7. A screw cap according to claim 1, characterized in that the cap bottom (3) defines a circular groove (36) radially inside the spacer (31) thus reducing the thickness of the cap bottom (3).

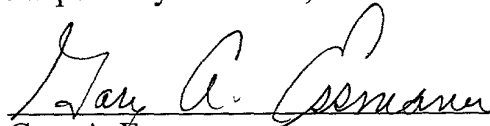
Claim 8 has been amended as follows:

8. A screw cap according to claim 1, characterized in that the closure membrane (37) has a greater thickness (d1) at least in a zone wherein it is contacted by the bottle neck than the thickness (d2) in a central zone thereof.

Claim 9 has been amended as follows:

9. A screw cap according to claim 1, characterized in that the sealing lip (19) is divided into several segments (19').

Respectfully submitted,

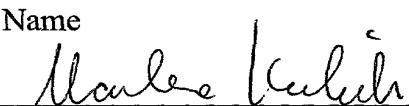


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(414) 271-7590
Atty. Docket No. 825-160

CERTIFICATE OF EXPRESS MAIL

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| | |
|---|------------------|
| <u>Marlene Kubiak</u> | |
| Name | Reg. No. |
|  | January 21, 2002 |
| Signature | Date |

ABSTRACT OF THE DISCLOSURE

The invention relates to a screw-type cap (19) having a sealing lip (19) with a base part (29) placed laterally in at least one thin part of the cap bottom (3). Whenever the cap bottom (3) bulges as a result of excess pressure in the bottle (13), the end of said sealing lip is pulled outwardly and said base part (29) is pulled inwardly. Tilting of the sealing lip (19) over the contact area in the neck (11) reduces the pressure force applied by the cap membrane (37) on said neck (11) and allows for a reduction of the excess pressure.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Attorney Docket No. 825-160

In the specification:

Please add the following paragraph at page 1, between the title and the first line of text as follows:

CROSS REFERENCE TO RELATED APPLICATION

The present application is the U.S. national stage application of International Application PCT/CH00/00399, filed July 20, 2000, which international application was published on February 1, 2001 as International Publication WO 01/07334 A1 in the German language. The International Application claims priority of Swiss Patent Application 1338/99, filed July 22, 1999 and Swiss Patent Application 2363/99 filed December 23, 1999.

SUMMARY OF THE INVENTION

On page 1, line 5, delete the phrase "according to the preamble of claim 1."

Before the paragraph beginning at line 19 of page 2, insert the following:

BRIEF DESCRIPTION OF THE INVENTION

Paragraph beginning at line 23 on page 2 has been amended as follows:

This object is solved by means of a screw cap having the features ~~of claim 1~~ as described in the claims. Further advantageous configurations of the invention are defined in the depending claims.

Before the paragraph beginning at line 15 of page 3 insert the following:

BRIEF DESCRIPTION OF THE DRAWINGS

Before the paragraph beginning at line 7 of page 4 insert the following:

BRIEF DESCRIPTION OF THE INVENTION

In the amended claims:

Claim 3 has been amended as follows:

3. A screw cap according to ~~any one of claims 1 or 2~~ claim 1, characterized in that the sealing lip (19) protrudes beyond a peak of the spacer (31) at a height (h_2) axially downwards to a height (h_1).

Claim 6 has been amended as follows:

6. A screw cap according to ~~any one of Claims 1 through 5~~ claim 1, characterized in that radially inside of the first spacer (31), a second spacer (35) is formed on the cap bottom.

Claim 7 has been amended as follows:

7. A screw cap according to ~~any one of Claims 1 through 6~~ claim 1, characterized in that the cap bottom (3) defines a circular groove (36) radially inside the spacer (31) thus reducing the thickness of the cap bottom (3).

Claim 8 has been amended as follows:

8. A screw cap according to ~~any one of Claims 1 through 6~~ claim 1, characterized in that the closure membrane (37) has a greater thickness (d_1) at least in a zone wherein it is contacted by the bottle neck than the thickness (d_2) in a central zone thereof.

Claim 9 has been amended as follows:

9. A screw cap according to ~~any one of Claims 1 through 8~~ claim 1, characterized in that the sealing lip (19) is divided into several segments (19').

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S. 05

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

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GILGEN, Robert, Armin (CH/CH): Kirchbündenstrasse
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(21) Internationales Aktenzeichen:

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20. Juli 2000 (20.07.2000)

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Postfach, CH-8501 Frauenfeld (CH).

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Deutsch

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21. Juli 1999 (21.07.1999)

CH

2363/99

23. Dezember 1999 (23.12.1999)

CH

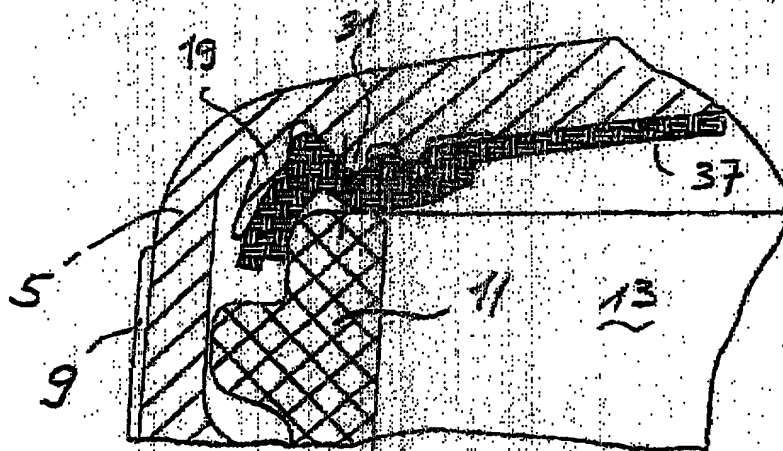
(71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von
US): HOFFMANN NEOPAC AG (CH/CH); Eisenbahn-
strasse 71, CH-3601 Thun (CH).

(81) Bestimmungsstaaten (national): AE, AG, AL, AM, AT,
AU (Gebrauchsmuster), AZ, BA, BB, BG, BR, BY, BZ,
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[Fortsetzung auf der nächsten Seite]

(54) Title: PLASTIC SCREW-TYPE CAP

(54) Bezeichnung: SCHRAUBVERSCHLUSS AUS KUNSTSTOFF



(57) Abstract: The invention relates to a screw-type cap (19) having a sealing lip (19) with a base part (29) placed laterally in at least one thin part of the cap bottom (13). Whenever the cap bottom (13) bulges as a result of excess pressure in the bottle (13), the end of said sealing lip is pulled outwardly and said base part (29) is pulled inwardly. Tilting of the sealing lip (19) over the contact area in the neck (11) reduces the pressure force applied by the cap membrane (37) on said neck (11) and allows for a reduction of the excess pressure.

[Fortsetzung auf der nächsten Seite]

WO 01/07334 A1

3/pvt

English translation of PCT/CH00/00388

- 1 -

PLASTIC SCREW CAP

The present invention relates to a screw cap made of a plastic material for screwing onto a thread on a neck of a bottle, according to the preamble of claim 1.

During storage and transportation of carbonated liquids and in particular of fruit juices, which are susceptible to an after-fermentation in the bottle subsequent to the bottling or after the first opening, there is a latent risk that pressure within the bottle will increase to such an extent that the bottle, be it made of glass or plastic, will burst and cause serious injuries or material damage. For this reason, tests have been conducted for providing the plastic screw caps used for closing bottles with a blow-off means, which, upon excess of a predetermined pressure within the bottle, enables the excess pressure to be blown-off.

In DE-C1 42 41 341 is disclosed the provision of a closing membrane supported in a bottle cap above the edge of the bottle opening via a circumferential annular rib. This support rib is coupled with the cap bottom or the closing membrane in such a manner that, with a bulging of the cap bottom or of a sealing disk or the closing membrane resting against the cap bottom, caused by an overpressure within the closed bottle, the rib allows same to be lifted from the edge of the bottle and hence an automatic ventilation of the inner bottle space. Furthermore, a plastic screw cap for closing a bottle is known from DE-A1 198 47 001 which dispenses with a closing membrane. Inside the screw cap, a sealing lip having a cone-shaped sealing surface is arranged, which rests against an outer sealing edge of the circular top face of the orifice of the bottle when the screw cap is screwed on. Recesses are provided in the cone-shaped sealing surface which extend from a zone closely outside the sealing edge

with the screw cap being screwed on, towards the edge of the sealing lip, and which are in communication with the surroundings. With a dome-shaped bulging of the bottom of the screw cap upon an increase of the inner pressure, the sealing
5 ring, with its sealing surface, slides on the sealing edge. As soon as the pressure within the bottle, and therefore the bulging of the bottom, is sufficiently large, the recesses become adjacent the zone of the sealing edge and thus create a passage for the gases from the interior of the bottle to
10 the surroundings, so that an overpressure be released.

These two known screw caps enable pressure blow-off when there is an excessive inner pressure within the bottle. However, the spread of uncertainty of the moment of the blow-
15 off and hence also of the pressure is very large. As a result there is only a conditional and hence an insufficient safety margin for the user.

It is an object of the present invention to provide a
20 screw cap which enables a pressure blow-off upon an overpressure within a narrowly delimited pressure range.

This object is solved by means of a screw cap having the features of claim 1. Further advantageous configurations of
25 the invention are defined in the depending claims

By the provision of the sealing lip partially resting on the orifice of the bottle and partially enclosing the outer periphery, and the elastically deformable closure membrane
30 disposed in between, it is possible to predetermine the blow-off moment and the blow-off pressure, respectively, in a sufficiently exact manner. The relative movement between a root of the sealing lip at the cap bottom and the bottle neck during a bulging of the cap, owing to an increased pressure
35 within the bottle, can also be predetermined.

In addition, a segmentation of the sealing lip has an advantageous effect. By means of the segmentation, depending on the requirements made on the sealing lip, the sealing lip
5 can be divided into 'n' circle segments having minimum tangential distances, or can be provided having distances exhibiting the same as or a greater length than the lengths of the segments of the sealing lip.

10 By using the elastic recovery force of the cap bottom, which comprises the energy storing component, a tight reclosure of the bottle is also achieved after the desired pressure drop.

15 The invention will now be described in more detail by way of example with reference to the accompanying drawings.

Figure 1 is a cross-section of a screw cap with a closure membrane inserted prior to it being screwed onto a
20 bottle neck, and with a first-opening security band;

Figure 2 shows a detail of the screw cap shown in Figure 1 to an enlarged scale;

25 Figure 3 is a cross-section of part of the screw cap after it has been screwed onto a bottle neck under normal pressure;

Figure 4 is a cross-section of part of the screw cap and
30 the bottle neck at increased internal pressure but before blow-off;

Figure 5 is a cross-section of part of the screw cap and the bottle neck at an overpressure permitting blow-off of the
35 excess pressure; and

Figure 6 is a view from below of a bottom of the cap showing, in the left half of the drawing, a segmented sealing lip with indentations and, in the right half of the drawing, a segmented sealing lip with large spacings.

The screw cap 1 shown in the Figures 1 through 6 comprises a cap bottom 3 and attached thereto a substantially cylindrical cap envelope 5, at the inner side of which a screw thread 7 is formed. On the outer side of cap envelope 5, ribs 9 or such like can be provided, which facilitate the removal of the cap from the neck 11 of a bottle 13 (Figures 3 through 5). At the lower edge 14 of the screw cap 1, a first-opening security band 16 can be provided in a known manner by injection molding.

In the zone above the thread 7, the cap envelope 5 defines an inner cylindrical portion 15, at the top of which is formed an arced or frusto-conical second portion 17 connecting it to the cap bottom 3. In the region of the arced or frusto-conical second portion 17, the thickness of the wall of screw cap 1 is decreased so as to be substantially smaller than that in the region of the cap bottom 3. A sealing lip 19 adjoins the second portion 17 with an outer peripheral surface 21, which in an unpressurized condition, has a substantially cylindrical shape parallel to that of the cylindrical portion 15 opposite it. The sealing lip 19 extends from a peak S_2 of a groove 22 formed between the cylindrical portion 15 and the outer surface 21 to a height h_1 within the interior of screw cap 1 to a tip 24 of the sealing lip 19. From the tip, an inner side 23 of the sealing lip 19 initially extends substantially parallel to the outer surface 21, and is then thickened at a step P, which acts as a pressure edge to impart a greater rigidity to the sealing lip 19 close to its root 29. Step P is situated at a height h_2

(Figure 1). An inner radial side 25 of the sealing lip 19 runs from step P at a slightly inwardly inclined angle up to a height h_3 and there ends at a peak S_1 (cf. Figure 1). The sealing lip 19 may take the form of a circumferential ring (Figures 1 and 2), or can be divided into a plurality of ring segments (Figure 6).

If the sealing lip 19 is divided into segments 19', various configurations are possible: in one these the circumferential sealing lip 19 is only subdivided into several segments 19' by way of indentations 19'' as shown in the left half of Figure 6, but in another configuration, spaces are left between the segments 19', the length A of which corresponds to the length B of the segments 19' or are larger, as shown in the right half of Figure 6. In preferred embodiments, the segments 19' and the spacings each define 60° angles or 45° angles.

The reduction of the thickness of the cap bottom 3 in the area of at least peak S_1 , forms an elastic region, which permits a relative movement, to be described later, between the sealing lip 19 and the cap bottom 3 when the latter bulges. A second downwardly extending wall 27 of a groove 28 defined below peak S_1 , ends approximately at the height h_2 and forms the outer side of a rib-shaped spacer 31 that rests above a top face 33 of the bottle neck 11 when the screw cap 1 is screwed on to the bottle 13. Concentric to the spacer 31 is a further resilient spacer 35, that is also formed in a rib-shaped manner. The cap bottom 3 may also define a circumferential groove 36 to the inner side of the radially inner spacer 35, which provides a local reduction in the thickness of the cap bottom 3.

A disk-shaped sealing or closure membrane or liner 37 made of soft plastic is held loosely above the thread 7 close

to the bottom 3 and spaced from the peaks of the sealing lip 19 and the spacers 31 and 35. Preferably, the thickness d_1 of the membrane 37 between its periphery and the region where it may contact the spacer 35, is larger than its thickness d_2 in its central zone. Alternatively, it is possible to configure the membrane 37 as an annulus that which extends radially substantially from the thread 7 to a position radially within the interior spacer 35. The periphery 38 of the membrane 37 lies beyond the peripheral surface 21 of the sealing lip 19, so that the tip 24 of the latter for a short term can rest against the membrane 37, before the screw cap 1 is screwed onto the bottle neck 11.

When the screw cap 1 is screwed onto the neck 11 of the bottle 13, the top face 33 and in particular the peripheral edge 39 thereof at the neck 11 of the bottle 13, displaces the sealing lip 19 radially outwards. The stepped zone of sealing lip 19 is thereby substantially filled by the membrane 37. The same applies to the space between the two spacers 31 and 35 and in part to the annular groove 28 between the sealing lip 19 and the exterior spacer 31 (cf. Figure 3). The periphery of the membrane 37 is bent downwards about the edge 39 of the bottle neck 11. In this condition and at normal pressure conditions within the bottle 13, the screw cap 1 will guarantee a perfect and tight closure of the bottle 13 by pressing the membrane 36 onto the bottle neck 11 with a large contact surface.

When the pressure inside the bottle 13 increases above a predetermined level as a result of fermentation or an excessive heating of the bottle contents, this causes a dome-shaped bulging of the cap bottom 3 (Figure 4). The bulging of cap bottom 3 is permitted by the annular reduction in the thickness of the cap bottom 3 in the region of the peak S_1 and the groove 28 between the sealing lip 19 and the spacer 31.

The bulging of the cap also permits the sealing lip 19 itself to move slightly axially upwards and a radial inward displacement of a point Q in the region of the root zone 29 ensues. This causes the sealing lip 19 to tilt about point P on step 23. As a result of this movement of the sealing lip 19, its tip 24 lying at h_1 lifts radially outwards and permits the closing membrane 37, which is clamped between the sealing lip 19 and the bottle neck 11, to be displaced in a direction which is also outwards and upwards. This translational movement decreases the pressure of the sealing lip 19 upon the edge 39 of the bottle neck 11 and simultaneously lifts the two spacers 31 and 35. The pressure of the closure membrane 37 upon the central zone of the top face 33 of the bottle neck 11 is thus reduced and enables gas to blow off to reduce the overpressure within the bottle. The blow-off is also assisted by movement of the closure membrane 37 into the space between the sealing lip 19 and the spacer 31 (cf. Figure 5).

As soon as the pressure within the bottle 13 decreases, the bulging of the cap bottom 3 reduces and the bottle 13 is once more tightly sealed by means of the screw cap 1.

Amended Claims

1. A plastic screw cap (1) for screwing onto a thread on a bottle neck (11) of a bottle (13) made of glass or plastic, comprising a cap bottom (3) and connected thereto a cylindrical cap envelope (5), at an inner side of which a screw thread (7) is formed for engagement with the thread of the bottle neck (11); a closure membrane (37) supported on the cap bottom (3) by at least one circumferential resilient spacer (31) that can rest on the membrane opposite a top face (33) of the bottle neck (11); characterized in that a sealing lip (19) is formed radially outwards of the spacer (31) and concentric thereto on the cap bottom (3) and can rest on the closure membrane (37), and in that the cap bottom (3) comprises, at least in a zone (S_1) lateral to a root (29) of the sealing lip (19), a region of reduced thickness that forms an elastic zone and defining a groove (28) for temporarily receiving a part of the closure membrane (37) when the pressure within the bottle (13) is increased.
2. A screw cap according to Claim 1, characterized in that regions of reduced thickness are formed in the cap bottom (3) bilaterally of the root (29) of the sealing lip (19).
3. A screw cap according to any one of Claims 1 or 2, characterized in that the sealing lip (19) protrudes beyond a peak of the spacer (31) at a height (h_2) axially downwards to a height (h_1).
4. A screw cap according to Claim 3, characterized in that the sealing lip (19) defines an inner side face

(25) with a circumferential step (P) forming a pressure edge.

5. A screw cap according to Claim 4, characterized in that the step (P) is located at the same height (h_2) as the peak of the at least one spacer (31) when it is in an unpressurized condition
6. A screw cap according to any one of Claims 1 through 5, characterized in that radially inside of the first spacer (31), a second spacer (35) is formed on the cap bottom.
7. A screw cap according to any one of Claims 1 through 6, characterized in that the cap bottom (3) defines a circular groove (36) radially inside the spacer (31) thus reducing the thickness of the cap bottom (3).
8. A screw cap according to any one of Claims 1 through 6, characterized in that the closure membrane (37) has a greater thickness (d_1) at least in a zone wherein it is contacted by the bottle neck than the thickness (d_2) in a central zone thereof.
9. A screw cap according to any one of Claims 1 through 8, characterized in that the sealing lip (19) is divided into several segments (19').
10. A screw cap according to Claim 9, wherein the segments (19') are formed either by indentations (19'') in the circumferential sealing lip (19) or by separate segments (19') spaced by a length (A) which is the same as or greater than the length (B) of the segments (19').

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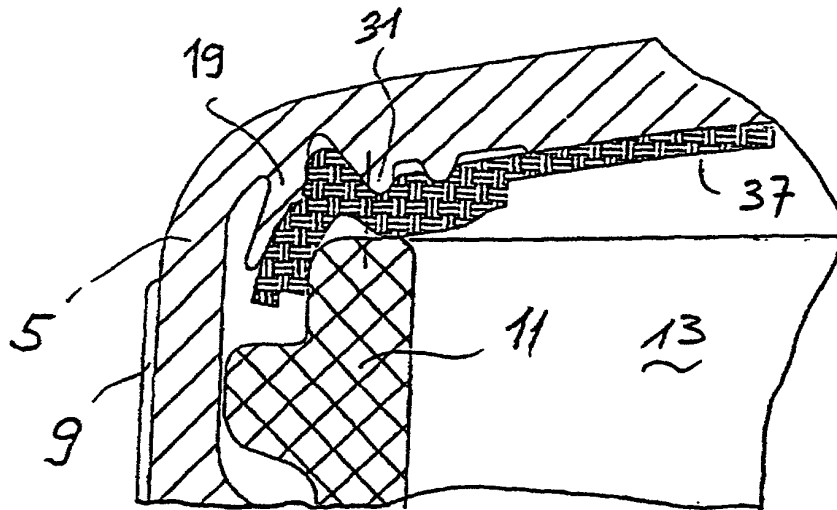
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[Fortsetzung auf der nächsten Seite]

(54) Title: PLASTIC SCREW-TYPE CAP

(54) Bezeichnung: SCHRAUBVERSCHLUSS AUS KUNSTSTOFF



(57) Abstract: The invention relates to a screw-type cap (19) having a sealing lip (19) with a base part (29) placed laterally in at least one thin part of the cap bottom (3). Whenever the cap bottom (3) bulges as a result of excess pressure in the bottle (13), the end of said sealing lip is pulled outwardly and said base part (29) is pulled inwardly. Tilting of the sealing lip (19) over the contact area in the neck (11) reduces the pressure force applied by the cap membrane (37) on said neck (11) and allows for a reduction of the excess pressure.

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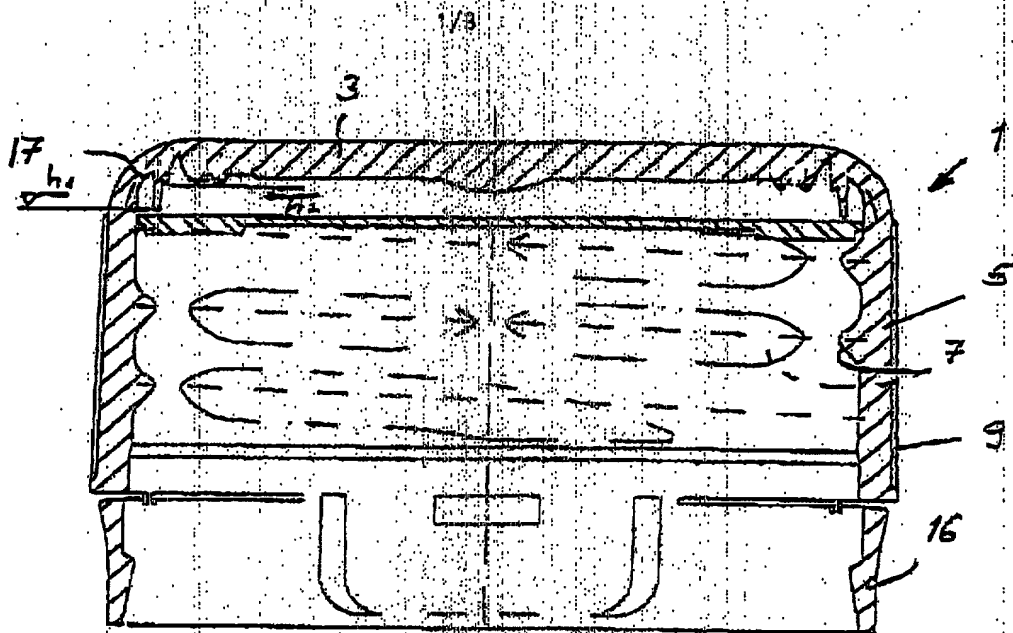


FIG 1

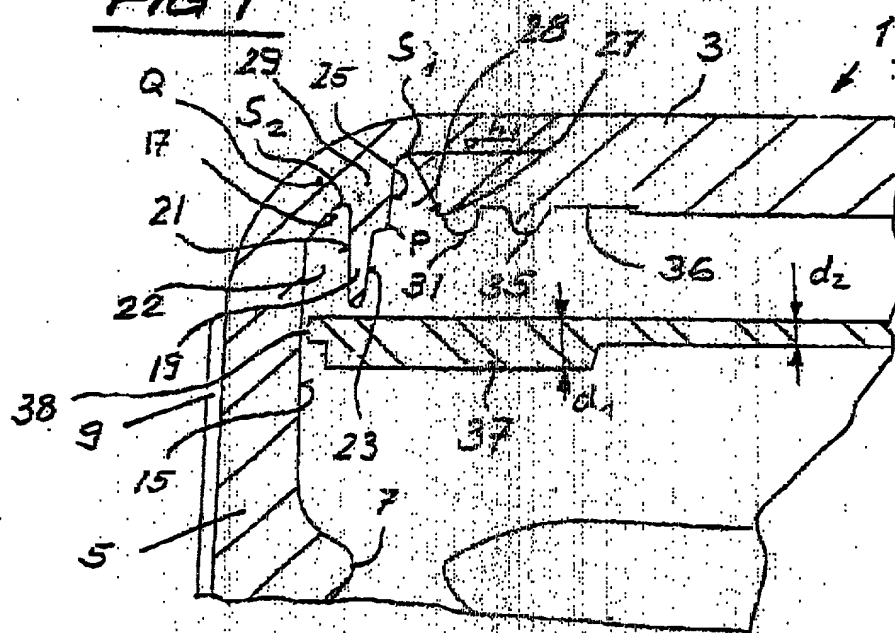
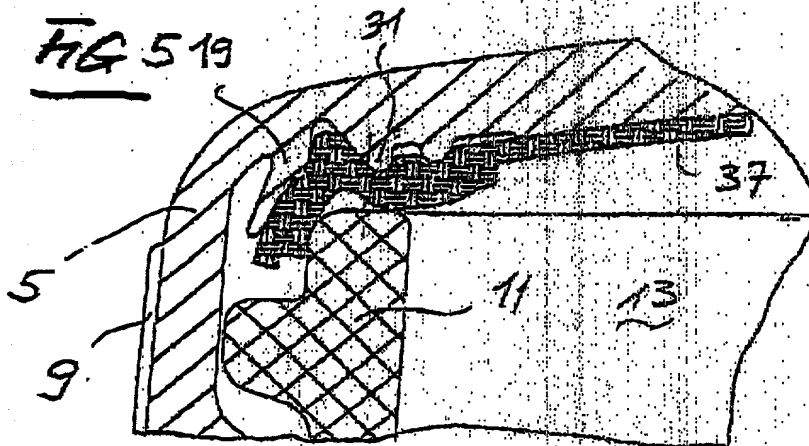
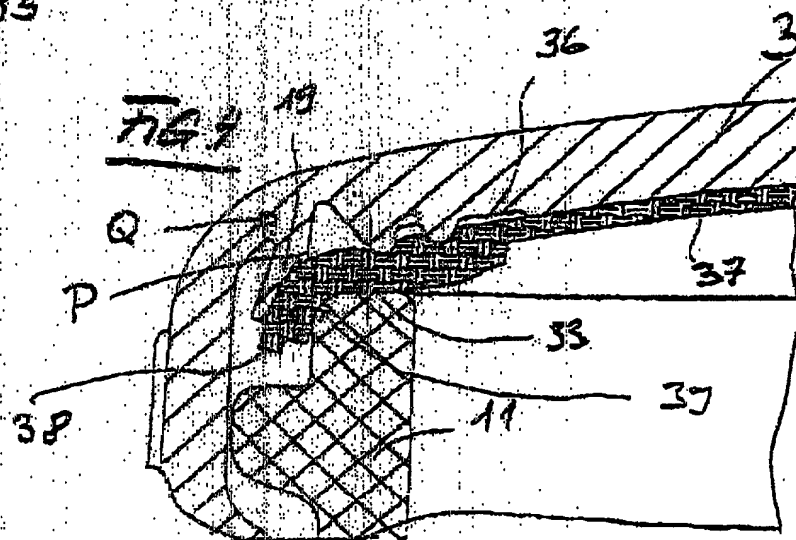
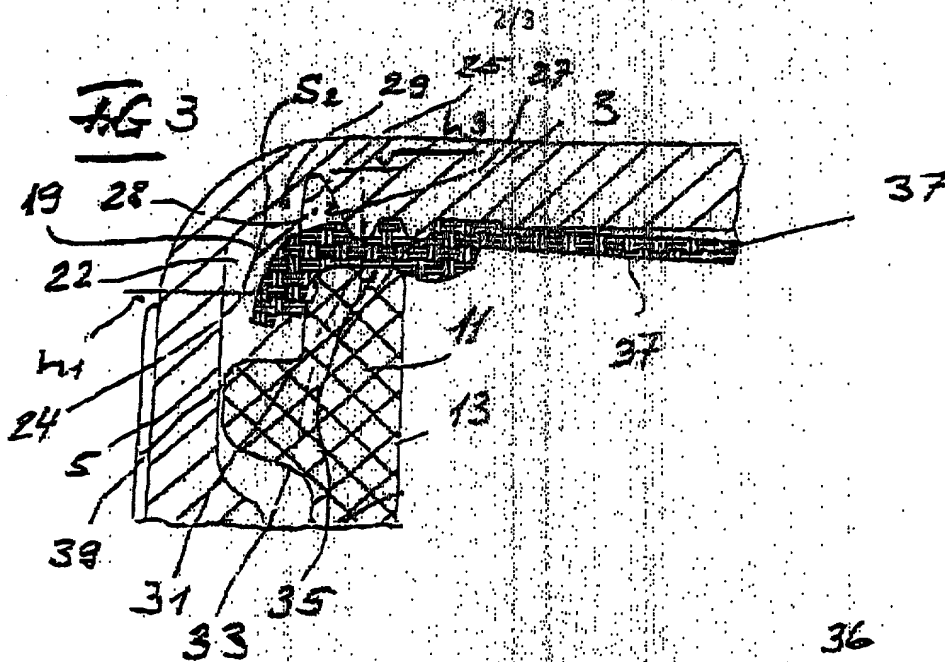


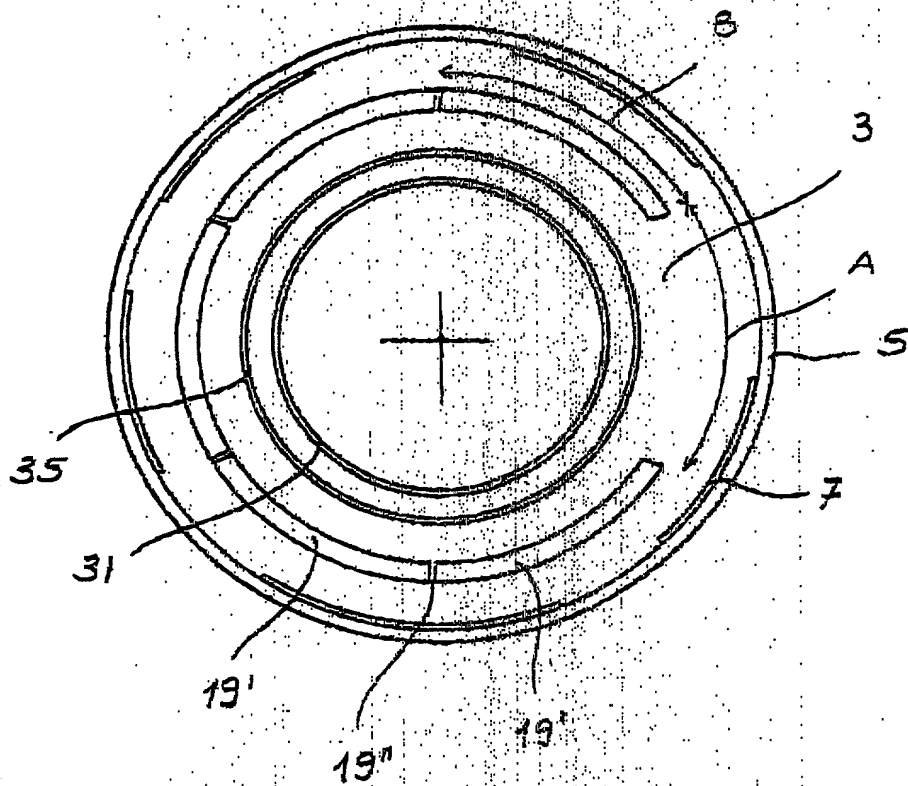
FIG 2

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Fig. 6



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| PTO/SB/01 (8/96) <div style="text-align: center;">DECLARATION</div> <div style="display: flex; justify-content: space-around;"><div>Declaration <input type="checkbox"/> Submitted with Initial Filing</div><div>OR</div><div>Declaration <input checked="" type="checkbox"/> Submitted after Initial Filing</div></div> | <table border="1" style="width: 100%; border-collapse: collapse;"><tr><td style="width: 50%;">Attorney Docket Number</td><td style="width: 50%;">825-160</td></tr><tr><td>First Named Inventor</td><td>Wilhelm Wazel</td></tr><tr><td colspan="2" style="text-align: center;">COMPLETE IF KNOWN</td></tr><tr><td>Application Number</td><td></td></tr><tr><td>Filing Date</td><td></td></tr><tr><td>Group Art Unit</td><td></td></tr><tr><td>Examiner Name</td><td></td></tr></table> | Attorney Docket Number | 825-160 | First Named Inventor | Wilhelm Wazel | COMPLETE IF KNOWN | | Application Number | | Filing Date | | Group Art Unit | | Examiner Name | |
| Attorney Docket Number | 825-160 | | | | | | | | | | | | | | |
| First Named Inventor | Wilhelm Wazel | | | | | | | | | | | | | | |
| COMPLETE IF KNOWN | | | | | | | | | | | | | | | |
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| Filing Date | | | | | | | | | | | | | | | |
| Group Art Unit | | | | | | | | | | | | | | | |
| Examiner Name | | | | | | | | | | | | | | | |

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

PLASTIC SCREW CAP

(Title of the Invention)

the specification of which
☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 07/20/2000 as United States Application Number or PCT

International Number PCT/CH00/00399 (if applicable) and was amended on (MM/DD/YYYY) 08/31/2001

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designed at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

| Prior Foreign Application Number(s) | Country | Foreign Filing Date (MM/DD/YYYY) | Priority Not Claimed | Copy Attached? | |
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| | | | | YES | NO |
| 1338/99 | Switzerland | 07/22/1999 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2363/99 | Switzerland | 12/23/1999 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
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I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365© of any PCT international application designated the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States of PCT International application in the manner provided by the first paragraph of Title 35, United States Code §112. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

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As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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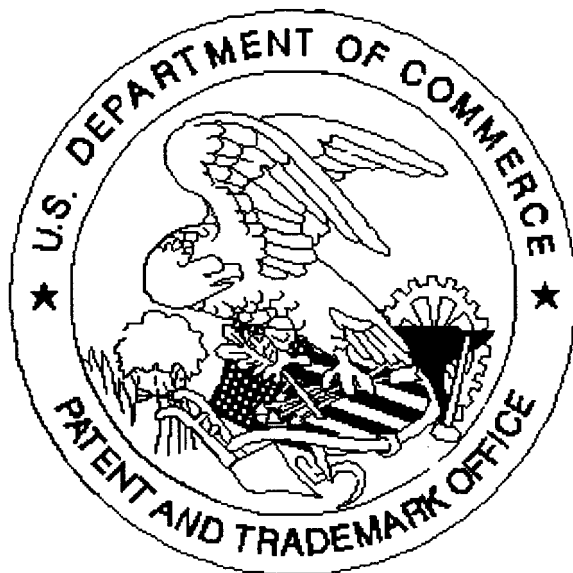
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| Inventor's Signature | <i>Robert Armin Gilgen</i> | Date | 2002-02-22 |
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